

PATENT APPLN. NO. 10/585,814
SUBMISSION UNDER 37 C.F.R. § 1.114

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IN THE CLAIMS:

1. (currently amended) A crank for a bicycle comprising an outer shell made of a fiber-reinforced plastic, a first insert member configured and arranged to introduce a load from a pedal shaft, and a second insert member coupled to a bracket spindle and configured and arranged to transmit a load to a sprocket through said outer shell, wherein said outer shell comprises at least two fiber-reinforced plastic members, at least a part of each of which is molded in advance, said at least two fiber-reinforced plastic members being overlapped and connected to each other so that a connection line thereof appearing outside extends in a longitudinal direction of the crank, and at least a part of said connection line is covered with a fiber-reinforced plastic layer which is provided outside said outer shell to form an outermost surface of the crank.

2. (original) The crank for a bicycle according to claim 1, wherein said outer shell is formed by bonding said at least two fiber-reinforced plastic members to each other.

3. (original) The crank for a bicycle according to claim 1, wherein said outer shell is formed by mechanically connecting said at least two fiber-reinforced plastic members to each other.

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4. (previously presented) The crank for a bicycle according to claim 1, wherein 50% or more of reinforcing fibers forming said at least two fiber-reinforced plastic members are in a range of 290 to 700 GPa in elastic modulus and in a range of 40 to 70% in fiber volume content (Vf).

5. (previously presented) The crank for a bicycle according to claim 1, wherein a formation of reinforcing fibers forming said at least two fiber-reinforced plastic members is a unidirectionally arranged formation of continuous fibers or a woven fabric.

6 - 7. (canceled)

8. (previously presented) The crank for a bicycle according to claim 1, wherein 50 to 100% of the entire length of said connection line is covered with a fiber-reinforced plastic layer.

9. (previously presented) The crank for a bicycle according to claim 1, wherein the thickness of said fiber-reinforced plastic layer on said connection line is less than the thickness of each of said at least two fiber-reinforced plastic members.

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10. (previously presented) The crank for a bicycle according to claim 1, wherein 30% or more of reinforcing fibers of said fiber-reinforced plastic layer on said connection line are oriented at an angle of 45 to 135 degrees relative to said connection line.

11. (previously presented) The crank for a bicycle according to claim 1, wherein a formation of reinforcing fibers forming said fiber-reinforced plastic layer is a woven fabric.

12. (previously presented) The crank for a bicycle according to claim 1, wherein at least one of said insert members is formed from a metal, a resin, a fiber-reinforced plastic or a combination thereof.

13. (original) The crank for a bicycle according to claim 12, wherein at least one of said insert members is formed from a combination of an aluminum alloy and a fiber-reinforced plastic.

14. (original) The crank for a bicycle according to claim 12, wherein at least one of said insert members is formed from a heat treated aluminum alloy having a fatigue strength of 10 kgf/mm² or more.

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15. (original) The crank for a bicycle according to claim 12, wherein at least one of said insert members is formed from an aluminum alloy formed with an oxide skin having a thickness of 3 to 30µm.

16. (previously presented) The crank for a bicycle according to claim 1, wherein at least one of said insert members is bonded directly to all of said fiber-reinforced plastic members.

17. (previously presented) The crank for a bicycle according to claim 2, wherein a Barcol hardness of an adhesive used for said bonding is smaller than that of a matrix resin forming said fiber-reinforced plastic members.

18. (previously presented) A method of producing a crank for a bicycle comprising the steps of:

 premolding a plurality of fiber-reinforced plastic members using a single-faced mold or a double-faced mold;

 integrating said plurality of fiber-reinforced plastic members premolded so that the fiber-reinforced plastic members are overlapped and connected to each other and a connection line thereof appearing outside extends in a longitudinal direction of

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the crank, and at least a part of said connection line is covered with a fiber-reinforced plastic layer.

19. (original) The method of producing a crank for a bicycle according to claim 18, wherein said plurality of fiber-reinforced plastic members molded in said premolding step are integrated as an outer shell of a first insert member configured and arranged to introduce a load from a pedal shaft and a second insert member coupled to a bracket spindle and configured and arranged to transmit a load to a sprocket.

20. (new) The crank for a bicycle according to claim 1, wherein said fiber-reinforced plastic layer is a winding of a tape substrate or a sheet substrate, wherein 30% or more of reinforcing fibers are oriented at an angle of 45 to 135 degrees relative to the connection line.